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10 CFR 50.73

February 25, 2009  
BW090021

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Braidwood Station, Unit 2  
Facility Operating License No. NPF-77  
NRC Docket No. STN 50-457

Subject: Licensee Event Report 2008-002-00 – Reactor Trip on Unit Auxiliary Transformer 241-1  
Sudden Pressure Relay Actuation Due to 2C Heater Drain Pump Motor Electrical Fault

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(iv)(A), as an event that resulted in a valid actuation of the reactor protection system and auxiliary feedwater system. On December 27, 2008, due to an actuation of a unit auxiliary transformer sudden pressure relay, Braidwood Station Unit 2 received an actuation of the reactor protection system (reactor trip) and the auxiliary feedwater system. 10 CFR 50.73(a) requires an LER to be submitted within 60 days following discovery of the event. Therefore, this report is being submitted by February 25, 2009.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. David Gullott, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,



Bryan Hanson  
Site Vice President  
Braidwood Station

Enclosure: LER 2008-002-00

<b>NRC FORM 366</b> (9-2007)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 08/31/2010																																						
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 5px 0;">(See reverse for required number of digits/characters for each block)</p>																																												
<b>1. FACILITY NAME</b> Braidwood Station, Unit 2				<b>2. DOCKET NUMBER</b> 05000457		<b>3. PAGE</b> 1 of 3																																						
<b>4. TITLE</b> Reactor Trip on Unit Auxiliary Transformer 241-1 Sudden Pressure Relay Actuation Due to 2C Heater Drain Pump Motor Electrical Fault																																												
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>																																						
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<b>9. OPERATING MODE</b>  1			<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> <i>(Check all that apply)</i>																																									
<b>10. POWER LEVEL</b>  100			<table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td></td> </tr> </table>						<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
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Specify in Abstract below or in NRC Form 366A																																												
<b>12. LICENSEE CONTACT FOR THIS LER</b>																																												
FACILITY NAME David Gullott, Regulatory Assurance Manager							TELEPHONE NUMBER <i>(Include Area Code)</i> (815) 417-2800																																					
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																																												
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX																																			
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<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO						<b>15. EXPECTED SUBMISSION DATE</b>																																						
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<b>ABSTRACT</b> <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i> <p>On December 27, 2008, at 14:18 hours, Braidwood Unit 2 Unit Aux Transformer 241-1 sudden pressure relay actuated causing a Unit 2 main generator trip, which resulted in a Unit 2 main turbine trip and subsequent Unit 2 reactor trip. Concurrent with the reactor trip, the 2C heater drain pump (HD) tripped on phase "A" and "C" phase over current.</p> <p>Operator response to the trip was proper and all safety related systems, structures and components operated normally during this event. The auxiliary feedwater system actuated, as expected, to maintain steam generator levels.</p> <p>The investigation of this event determined the initiating event to the reactor trip was a phase-to-phase motor fault at the 2C HD pump motor terminal housing box, which caused a trip of the 2C HD pump on phase over current. Inspection of the motor lead box found the motor lead from one phase ("A" phase) in contact with the bus bar for another phase ("C" phase) due to excessive motor lead length. The root cause of the HD pump trip was determined to be that the procedure guidance for trimming the motor leads was deficient in that a lack of adequate information was provided for the desired motor lead length. The corrective action to prevent recurrence is to revise the existing procedure to provide clear direction on the desired length of power cables.</p> <p>There were no actual safety consequences impacting plant or public safety as a result of this event.</p> <p>This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to actuation of the reactor protection system (reactor trip) and the auxiliary feedwater system.</p>																																												

LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Braidwood, Unit 2	05000457	YEAR	SEQUENTIAL NUMBER	REV NO.	2 of 3
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## NARRATIVE

**A. Plant Operating Conditions Before The Event:**

Event Date: December 27, 2008

Event Time: 14:18

Unit: 2 MODE: 1

Reactor Power: 100 percent

Unit 2 Reactor Coolant System (RC) [AB]: Normal operating temperature and pressure

**B. Description of Event:**

There were no structures, systems or components inoperable at the beginning of the event that contributed to the severity of the event.

At 14:18 hours, the Unit 2 Unit Aux Transformer (UAT) 241-1 sudden pressure relay actuated causing a Unit 2 main generator [TB] trip, which resulted in a Unit 2 main turbine trip and subsequent Unit 2 reactor trip. Concurrent with the reactor trip, the 2C heater drain (HD) [SI] pump tripped on phase "A" and "C" phase over current.

Operator response to the trip was proper and all safety related systems, structures and components operated normally during this event. Following the reactor trip, all four Unit 2 steam generators [SJ] reached their low-2 reactor trip setpoints and the Unit 2 pressurizer [AB] reached its low pressure reactor trip setpoint, all of which is an expected response on a trip from full reactor power. The auxiliary feedwater system [BA] actuated, as expected, to maintain steam generator levels, and the Unit 2 steam generator levels and pressurizer pressure were restored per applicable procedures. All control rods fully inserted into the reactor core. No secondary relief valves lifted and no secondary steam was released as a result of the reactor trip.

This event is reportable under 10CFR50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10CFR50.73(a)(2)(iv)(B) including any event or condition that results in actuation of the reactor protection system (RPS) when the reactor is critical, and actuation of the PWR auxiliary feedwater system.

**C. Cause of Event**

The investigation of this event determined the initiating event to the reactor trip was a phase-to-phase ("A" to "C" phase) motor fault at the 2C HD pump motor terminal housing box, which caused a trip of the 2C HD pump on phase over current.

Motor inspection revealed that the internal motor-to-connection box power leads were "burned off" and both "A" and "C" phase motor overcurrent relays had actuated. The phase-to-phase fault resulted in a significant electrical current draw and was of sufficient magnitude to cause a pressure transient in the UAT 241-1 transformer. This pressure transient led to the UAT 241-1 trip due to actuation of the sudden pressure relay logic circuitry (2 out of 2 devices).

Inspection of the 2C HD motor lead box and review of the work package, following the event, determined that during a recent 2C HD motor refurbishment (completed in May 2008), the motor leads were left excessively long and not adequately secured to support the excess cable length. During operation of the motor, the motor leads shifted and a lead from the "A" phase came to rest on the "C" phase bus bar. Ambient vibration from the 2C HD pump and motor operation caused degradation of the motor lead insulation rubbing on the corner of the exposed bus bar, and ultimately a breach of the insulation to the point where a phase-to-phase fault occurred.

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**NARRATIVE**

Investigation determined that there was no specific guidance in any applicable procedure that provides direction on the proper length of conductors. Therefore, the root cause of the HD trip was determined to be that the procedure guidance for trimming the motor leads was deficient in that a lack of adequate information was provided for the desired motor lead length.

**D. Safety Consequences:**

There were no safety consequences impacting plant or public safety as a result of this event. All safety related systems, structures and components operated normally during this event.

The UAT sudden pressure relays trip the main generator and its associated output breakers in order to isolate the transformer from fault current sources and protect the generator. A main generator trip initiates a turbine trip, resulting in a reactor trip above 30 percent power. The reactor trip is necessary due to a loss of the secondary heat sink for the reactor coolant system. Thus, the actuation of the reactor protection system was valid for this plant condition and occurred without incident.

During the reactor shutdown, all required safety systems responded appropriately. There was no loss of any function that would have prevented fulfillment of actions necessary to 1) Shutdown the reactor and maintain it in a safe shutdown condition, 2) Remove residual heat, 3) Control the release of radioactive material, or 4) Mitigate the consequences of an accident.

The UATs are part of the non-Class 1E auxiliary power system and are not credited in the mitigation of any postulated design basis accidents. The non-safety related HD pumps provide a portion of the condensate flow to the main feedwater system and also are not credited in the mitigation of any postulated design basis accidents.

This event did not result in a safety system functional failure.

**E. Corrective Actions:**

The corrective action to prevent recurrence is to revise the existing procedure to provide clear direction on the desired length of power cables.

**F. Previous Occurrences:**

There have been no similar Licensee Event Report events at Braidwood Station in the last three years.

**G. Component Failure Data:**

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
Westinghouse	Heater Drain Pump Motor Terminal Housing	NA	N/A